

## IT IS CLAIMED:

1. A method for detecting the binding of or interaction between each or any of a plurality of ligands and one or more target antigens, said method comprising:

(a) reacting the antigen(s) with a set of electrophoretic tag (e-tag) probes, the set comprising  $j$  members, and each of said e-tag probes having the form:

(D, M<sub>j</sub>) - L - T<sub>j</sub>, where

(i) D is a detection group comprising a detectable label;

(ii) T<sub>j</sub> is a ligand capable of binding to or interacting with a target antigen,

(iii) L is a linking group connected to T<sub>j</sub> by a bond that is cleavable by a selected cleaving agent when the probe is bound to or interacting with the target antigen, wherein cleavage by said agent produces an e-tag reporter of the form (D, M<sub>j</sub>) - L', where L' is the residue of L attached to (D, M<sub>j</sub>) after such cleavage,

(iv) M<sub>j</sub> is a mobility modifier having a charge/mass ratio that imparts a unique and known electrophoretic mobility to a corresponding e-tag reporter of the form (D, M<sub>j</sub>) - L', within a selected range of electrophoretic mobilities with respect to other e-tag reporters of the same form in the probe set; and

(v) (D, M<sub>j</sub>) - includes both D - M<sub>j</sub> - and M<sub>j</sub> - D -;

(b) treating the contacted antigen(s) with the cleaving agent, thereby to produce a mixture of e-tag reporters having the form (D, M<sub>j</sub>) - L', and uncleaved and/or partially cleaved probes,

(c) exposing said mixture to a capture agent effective to bind to uncleaved or partially cleaved e-tag probes, but not the corresponding e-tag reporters, and effective to

(i) impart a mobility to the probes bound to capture agent that prevents the probes from electrophoretically migrating within said range of electrophoretic mobilities or

(ii) immobilize the probes on a solid support;

(d) fractionating e-tag reporters having the form (D, M<sub>j</sub>) - L' by electrophoresis, to effect separation of the e-tag reporters, and

(e) identifying the electrophoretic mobilities of one or more electrophoretic bands, each band corresponding to an e-tag reporter that is uniquely assigned to a target antigen.

2. The method of claim 1, wherein T<sub>j</sub> is biotinylated and the capture agent is avidin or streptavidin.

3. The method of claim 1, wherein T<sub>j</sub> contains an antigen and the capture agent is an antibody or antibody fragment that binds specifically to the antigen.

4. The method of claim 1, wherein T<sub>j</sub> contains a particle or mass group that effectively prevents its migration under electrophoretic conditions within the range of electrophoretic mobilities of the e-tag reporters.